

REMARKS

Claims 1-21 are pending in the application.

Rejections Under 35 U.S.C. 103(a)

Claims 1-7 and 11-17 stand rejected under 35 U.S.C. 103(a) as being obvious over U.S. Patent No. 5,580,947 to Brahm et al. (hereinafter "Brahm"). The Examiner suggests that Brahm teaches the elements of the claimed invention with a reasonable expectation of success. Applicants respectfully ask for reconsideration.

The present invention is directed to a process for preparing a polyisocyanate containing acylurea groups. The process includes the step of reacting an isocyanate with a carboxylic acid compound in the presence of a metal-salt catalyst at a temperature of 20 to 220°C. The carboxylic acid compound is limited to acetic acid, hexanoic acid, cyclohexane carboxylic acid, perhydronaphthalenecarboxylic acid, succinic acid, adipic acid, azelaic acid, dodecanedioic acid, eicosanedioic acid, cyclohexanedicarboxylic acid, aromatic mono- or di- carboxylic acids, and mixtures thereof.

Brahm discloses a process for the production of olefinically unsaturated isocyanates. The process includes reacting an isocyanate component with an olefinically unsaturated reactive component. The isocyanate component includes isophorone diisocyanate and other organic polyisocyanates. The olefinically unsaturated component includes 80-100% olefinically unsaturated carboxylic acids and optionally other monobasic or polybasic carboxylic acids. The reaction can be carried out in the presence of any of a laundry list of catalysts.

The Examiner suggests that Brahm discloses using some of the claimed carboxylic acids. However, the examiner completely ignores the fact that this is an optional minority component (up to 20%) in Brahm and that Brahm specifically requires using olefinically unsaturated carboxylic acids (80-100%). The present claims limit the carboxylic acid to embodiments where specific alkyl and aromatic carboxylic acids are used. The selected carboxylic acids effectively exclude the use of olefinically unsaturated carboxylic acids, which are required by Brahm.

An object of the present invention was to provide a catalyst for the reaction of isocyanates with carboxylic acids that leads to clear (i.e., without any turbidity) and only weakly colored products (i.e., APHA < 120). This aim was achieved by metal catalysts claimed in the present invention. Brahm does not disclose (explicitly or implicitly) the combination according to the present invention or teaches it to obtain polyisocyanates having acylurea groups exhibiting the desired properties.

There is no disclosure, suggestion, teaching, or motivation in Brahm to make polyisocyanates containing acylurea groups using the presently claimed process or any reasonable expectation of success for obtaining the desired properties.

Therefore the rejection of Claims 1-7 and 11-17 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,970,600 to Fralkenstein et al. (hereinafter "Falkenstein") in view of Brahm. The Examiner indicates that although Falkenstein does not disclose using a catalyst, it would have been obvious to use the catalyst of Brahm in the process of Falkenstein in order to accelerate the reaction.

Falkenstein discloses solutions of isocyanurate-polyisocyanates containing amide and/or acylurea groups in monomeric diisocyanates and/or polyisocyanates which are free from amide, acylurea and/or isocyanurate groups. The isocyanurate-polyisocyanates are obtained by reacting polybasic carboxylic acids with diisocyanates and/or polyisocyanates to give diisocyanates and/or polyisocyanates containing amide groups and/or acylurea groups, converting the diisocyanates and/or polyisocyanates containing amide and/or acylurea groups by trimerization and, optionally, polymerization, into isocyanurate-polyisocyanates containing amide and/or acylurea groups. The products are mixed with monomeric diisocyanates and/or polyisocyanates.

As was indicated above, Brahm directs one skilled in the art to catalysts that are useful when olefinically unsaturated reactants are present. However, Falkenstein discloses that the carboxylic acids which can be used are aliphatic and/or aromatic dicarboxylic acids of 4 to 20 carbon atoms (col. 2, lines 36-37).

In order to arrive at the present invention, one skilled in the art would have to parse out the specifically claimed alkyl and aromatic carboxylic acids and then assume that a catalyst meant for unsaturated carboxylic acids would be effective with alkyl or aromatic carboxylic acids. There is no disclosure in Falkenstein or Brahm that would make such an assumption reasonable. Therefore, there is no motivation to combine references as the Examiner has.

The teaching, motivation or suggestion to make alkyl and/or aromatic polyisocyanates containing acylurea groups using the presently claimed process and the reasonable expectation of success for such are not found in the combination of Falkenstein and Brahm. Therefore, the rejection of Claims 1-21 under 35 U.S.C. § 103(a) should be withdrawn.

Claims 1-21 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,616,061 to Henning et al. (hereinafter "Henning") in view of Brahm. The Examiner indicates that although Henning does not disclose using a catalyst, it would have been obvious to use the catalyst of Brahm in the process of Henning in order to accelerate the reaction. Applicants respectfully request reconsideration.

Henning discloses polyisocyanate addition products, which contain a quantity of incorporated sulphonate and/or carboxylate groups and optionally ethylene oxide units, incorporated in a polyether chain to guarantee the solubility or dispersibility thereof in water. Diisocyanates corresponding to Q(NCO)₂, where Q represents an aliphatic hydrocarbon radical having 4 to 12 carbon atoms, a cycloaliphatic hydrocarbon radical having 6 to 15 carbon atoms, an aromatic hydrocarbon radical having 6 to 15 carbon atoms or an araliphatic hydrocarbon radical having 7 to 15 carbon atoms are used to make the addition products.

As stated above, Brahm directs one skilled in the art to catalysts that are useful when olefinically unsaturated reactants are present. Henning discloses using carboxylic acid functional saturated or unsaturated aliphatic hydrocarbons having from 1 to 35 carbon atoms, an aromatic hydrocarbon, or an araliphatic hydrocarbon radical having 7 to 10 carbon atoms.

In order to arrive at the present invention, one skilled in the art would have to parse out the specifically claimed alkyl and aromatic carboxylic acids and then assume that a catalyst meant for unsaturated carboxylic acids would be effective with alkyl or aromatic carboxylic acids. There is no disclosure in Henning or Brahm that would make such an assumption reasonable. Therefore, there is no motivation to combine references as the Examiner has.

The teaching, motivation or suggestion to make alkyl and/or aromatic polyisocyanates containing acylurea groups using the presently claimed process and the reasonable expectation of success for such are not found in the combination of Henning and Brahm. Therefore, the rejection of Claims 1-21 under 35 U.S.C. § 103(a) should be withdrawn.

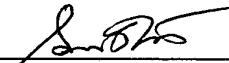
CONCLUSION

Because Brahm only discloses the limited application of using metal catalysts with olefinic isocyanates and olefinic carboxylic acids and it does not suggest or provide any motivation to use such catalysts with isocyanates and alkyl or aromatic carboxylic acids, it does not render the present claims obvious. Further, because there is no disclosure in Brahm to use the metal catalyst with other than olefinic materials, there is no motivation provided in Brahm to expect success or to use the catalyst with non-olefinic materials. Therefore, relying on Brahm to modify systems using isocyanates with alkyl and/or aromatic carboxylic acids is not proper and does not provide a *prima facie* case of obviousness.

Therefore, none of the claims are obvious over the cited prior art.

Applicants believe that Claims 1-21 are in form for allowance and respectfully request reconsideration and that a timely Notice of Allowance be issued in this application.

Respectfully submitted,

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